

# **CITY OF CUPERTINO GENERAL PLAN AMENDMENT 1-GPA-80 TECHNICAL APPENDIX - B**

## **TRAFFIC Methodology and Analysis**

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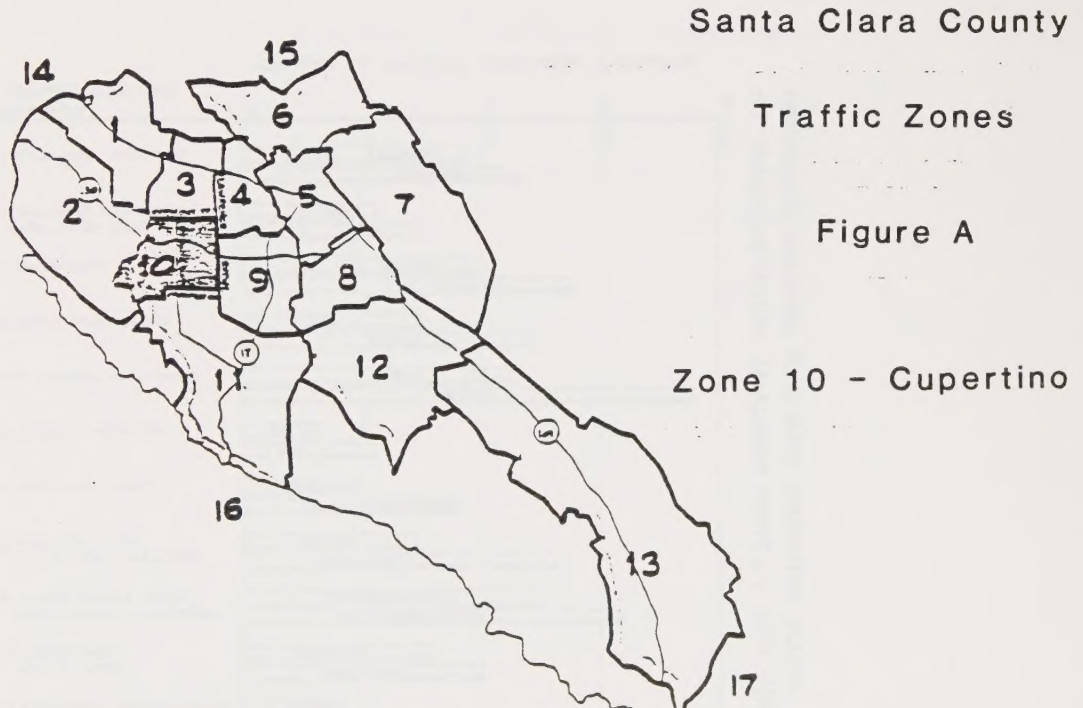
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## Background

In 1973, the City utilized a traffic model prepared by CalTrans to forecast expected traffic impacts resulting from development in surrounding communities and build-out of the City's General Plan. The CalTrans model assigned traffic without regard to capacity limitations of the affected roadways.

The City's latest traffic work was developed based upon a Santa Clara County 1975 traffic model which projected AM peak hour traffic volumes through 1990. The Santa Clara County model divided the County into 13 zones. The model projected AM peak traffic levels because during the AM period the volumes more truly reflect pure work related trips.



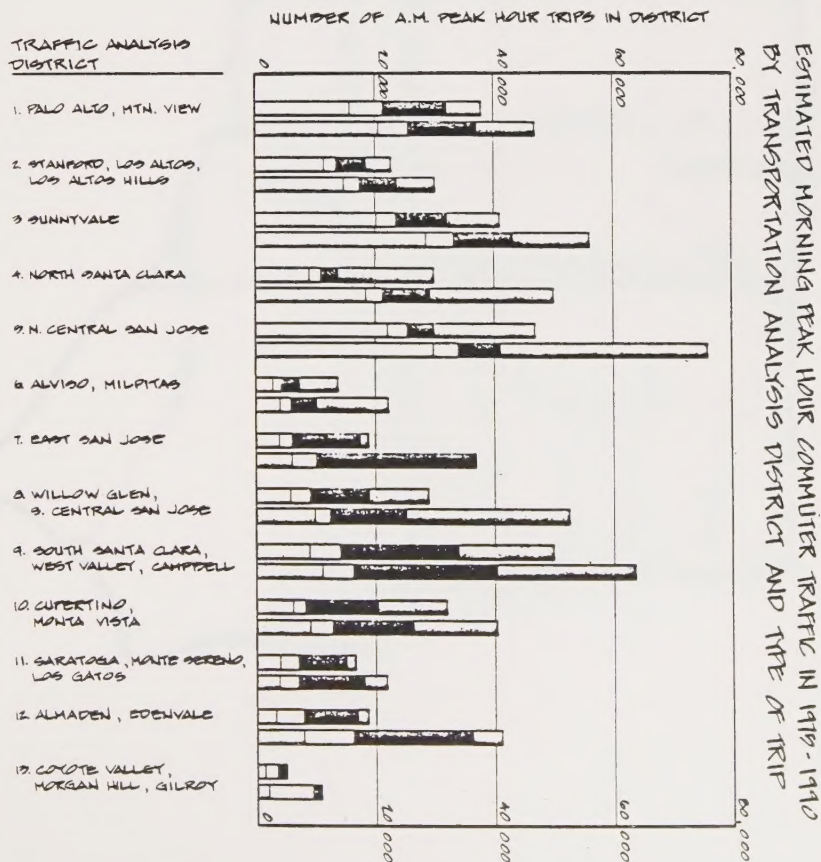
The ABAG/MTC model evaluated the following factors:



# ABAG/MTC MODEL

1. NUMBER OF HOUSEHOLDS, WORKERS PER HOUSEHOLDS
2. TOTAL POPULATION
3. EMPLOYEES' RESIDENCES, DIVIDED UP INTO MULTI-SINGLE FAMILY DWELLINGS
4. MEAN HOUSEHOLD INCOME, DIVIDED INTO LOW, MEDIAN, AND HIGH
5. ESTABLISHED TRAVEL PATTERNS FOR EACH OF THE INCOME LEVELS ABOVE
6. ESTABLISHED DIFFERENT CATEGORIES OF EMPLOYMENT
7. DEVELOPED TRAVEL TIMES FOR AUTO, TRANSIT, AND OTHER MODES OF TRAVEL

The following table outlines the projected growth in commuter traffic from 1975 through 1990 for the 13 traffic zones.

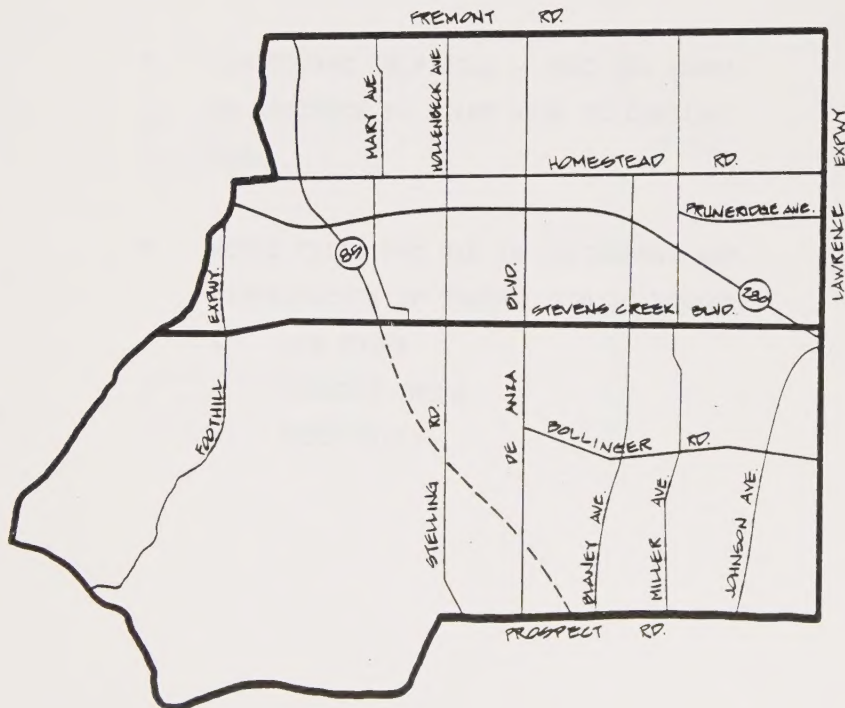




As the above table illustrates, most of the growth in future commuter traffic will occur in Zone 5 (north San Jose), Zone 7 (east San Jose), Zone 8 (Willow Glen south central San Jose), and Zone 12 (Almaden/Edenvale).

Cupertino is located within Zone 10 which is expected to increase commute trips by approximately 8,000 trips from 32,000 to 40,000 total trips. Zone 10 consists of Cupertino and portions of Sunnyvale up to Fremont Avenue to the north, and portions of San Jose located south of Bollinger Road, east of Saratoga-Sunnyvale Road and Prospect Road, and west of Lawrence Expressway.

### Zone 10





## Validating the Model

With the above information in mind, Cupertino's traffic evaluation first attempted to validate the County's traffic model. The following outlines the four elements of the model which had to be verified.

### MODEL CONFIRMS

- \* STAFF PERFORMED 4 SERIES OF TESTS
  - TOTAL TRIPS
  - JOB TRIPS
  - HOUSING TRIPS
  - THRU TRIPS
  
- \* CONSULTANT CH<sub>2</sub>M HILL - USED NEW MODEL  
IN ADDITION TO STAFF WORK TO CONFIRM  
WORK
  
- \* MODEL VALID FOR USE IN ASSIGNMENT AND  
DISTRIBUTION OF TRAFFIC FOR FOLLOWING:
  - JOB TRIPS
  - HOUSING TRIPS
  - THRU TRIPS

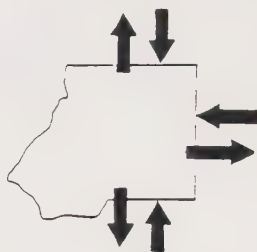


# STAGE 1

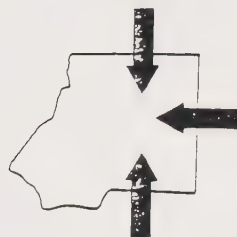
VERIFY MODEL PREDICTION

4 ELEMENTS TO BE CHECKED

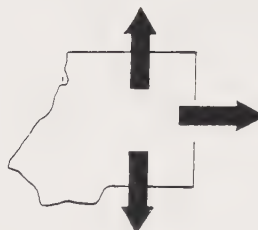
TOTAL TRAFFIC  
AT SCREEN LINE



JOBS



HOUSING

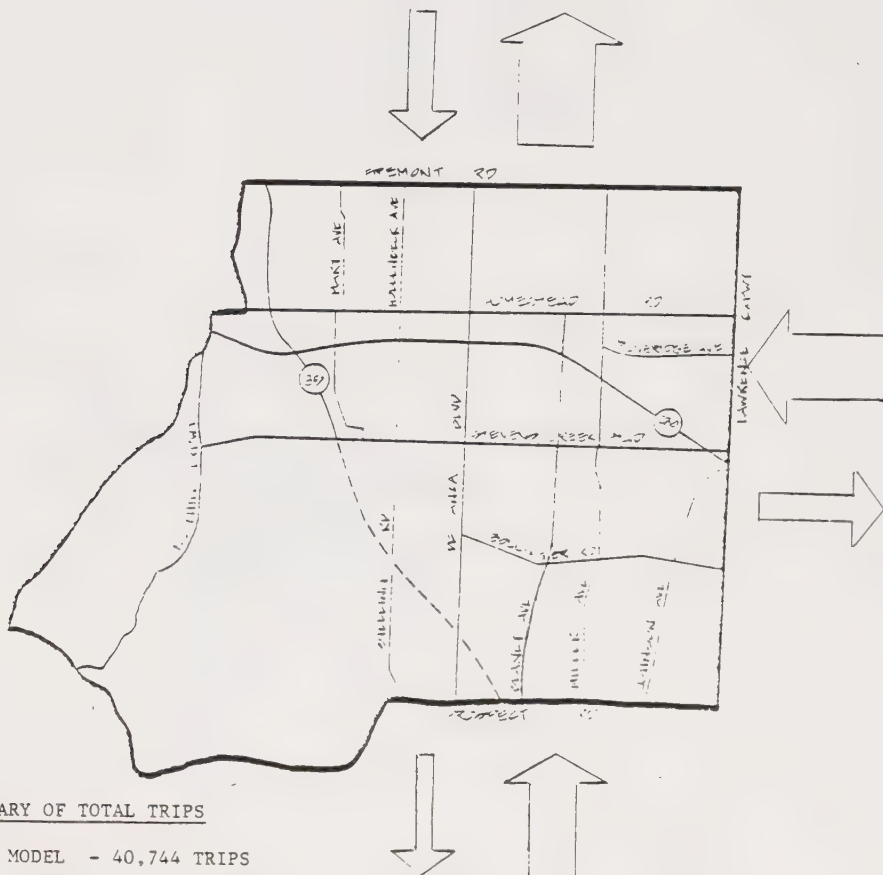


THRU





The transportation evaluation had to consider whether the model accurately predicted the total number of trips passing through the zone, the number of job trips, housing trips, and through trips which could be expected. The first step required a simple accounting of traffic which intersected the screen line which was established approximately midway through Zone 10 along Stevens Creek Boulevard. The screen line represents a control point utilized to measure traffic. For the total trip assessment, screen lines were established at Prospect Road, Lawrence Expressway and Freemont Avenue. The model predicted roughly 40,700 trips would be generated which was borne out roughly by the actual total count of 42,600. (See illustration of Zone 10 below):



SUMMARY OF TOTAL TRIPS

MODEL - 40,744 TRIPS  
ACTUAL - 42,600

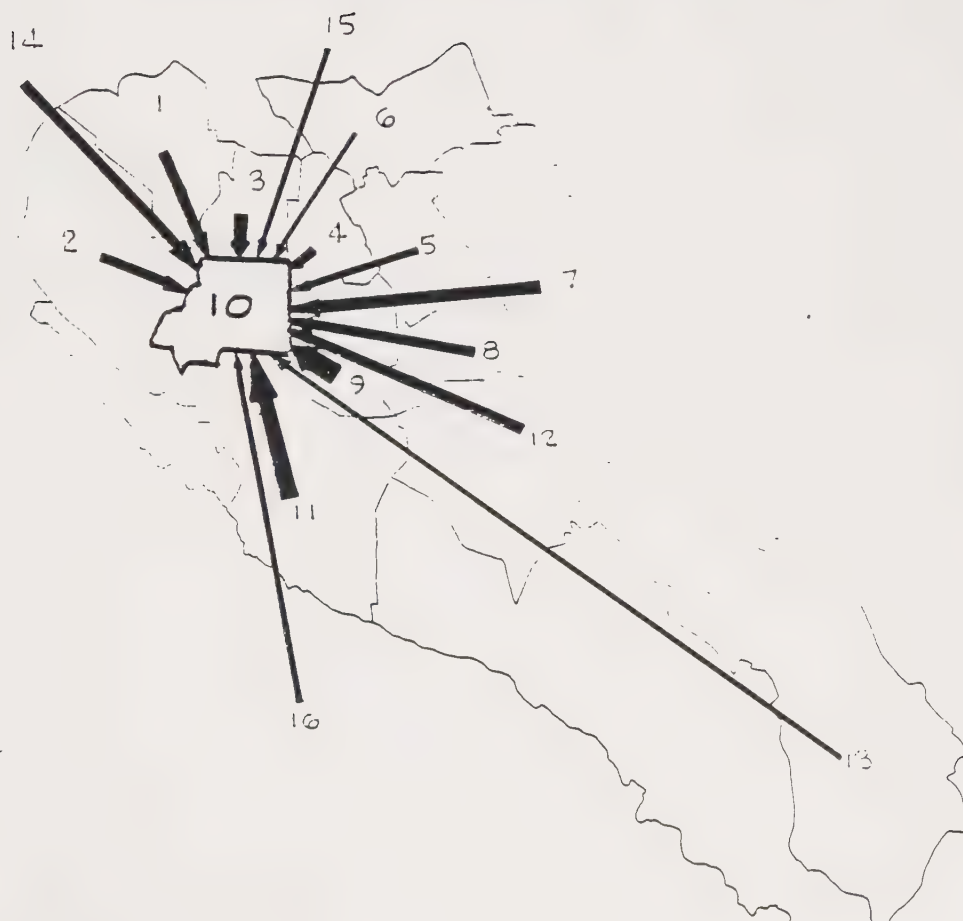
SUMMARY OF TRIP DISTRIBUTION

FROM HOUSING	37.7
WITHIN 10	6.1
TO JOBS	18.6
THRU TRIPS	37.5
	<hr/> 100 %



The next step was to confirm that the model accurately predicted the number of job trips in Zone 10. To do this, employee zip codes were obtained from employers located within Zone 10 (Vallco Park area, Four Phase, and Hewlett-Packard) and plotted on a map to evaluate their distribution. The following chart illustrates the percentage of job-related trips to Zone 10 from the other zones in the County.

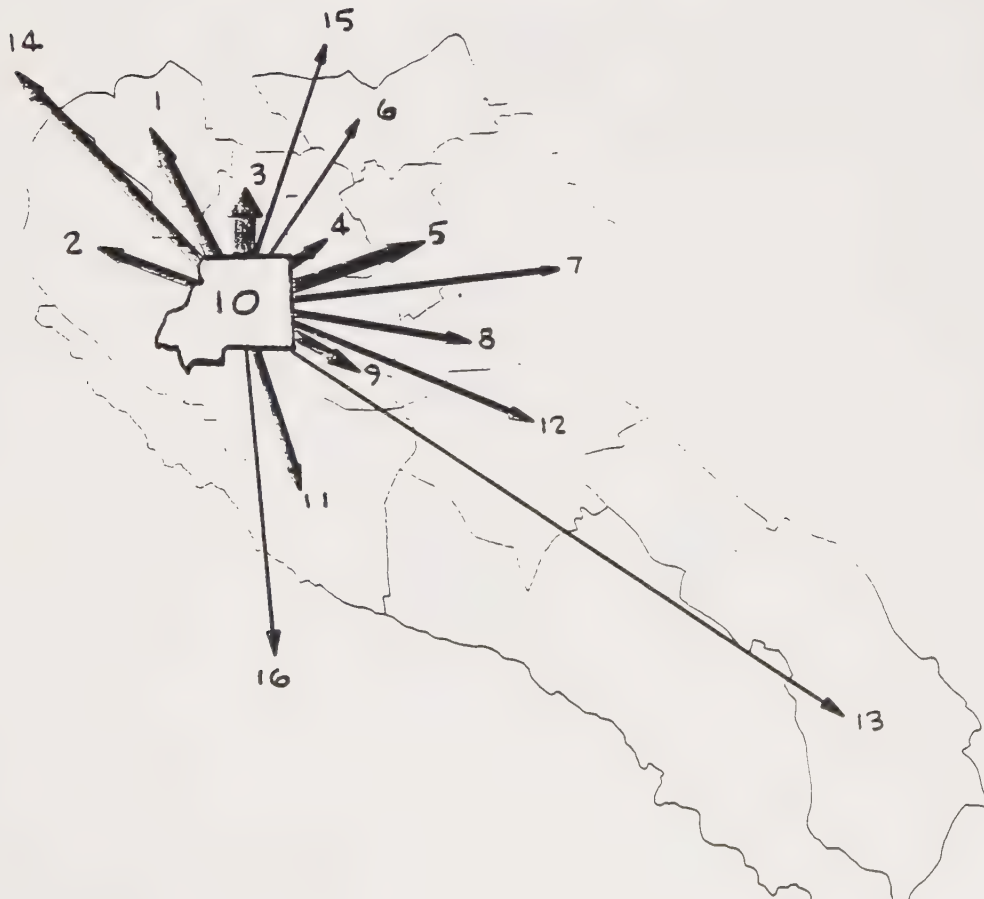
TRIPS ENDING AT  
JOBS IN ZONE 10  
MODEL DISTRIBUTION  
VS.  
VALLCO PARK,  
FOUR-PHASE,  
H.P.





The next step was to evaluate the models predicting capability for housing leaving Zone 10 and working in other zones of the County. The staff utilized responses to Cupertino Scene Sound-Off Cards which were plotted on a map to indicate job locations outside of Zone 10. The following chart illustrates the movement of housing to job-related trips from Zone 10.

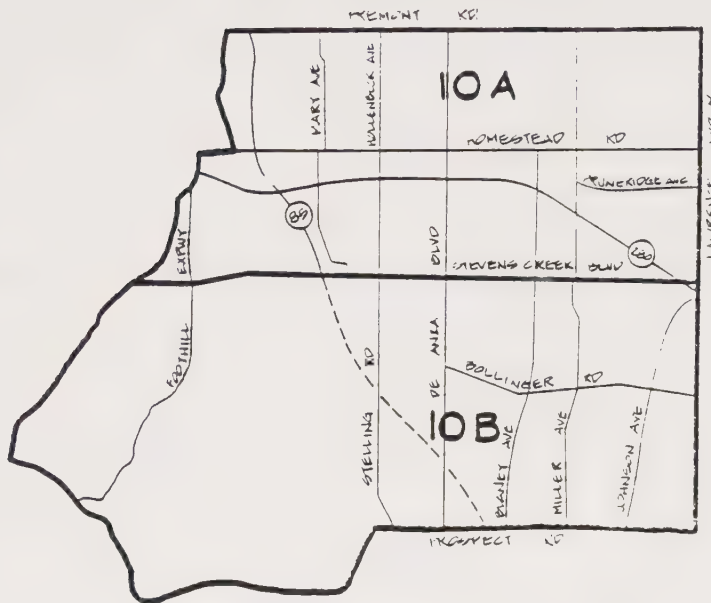
TRIPS STARTING FROM  
HOUSING IN ZONE 10  
MODEL DISTRIBUTION  
VS.  
339 CUPERTINO SCENE RESPONSE





With the housing and trip verification completed, the next step was to evaluate through trips. To accomplish this, staff divided Zone 10 into 10A and 10B

DIVIDE ZONE 10 INTO 10A AND 10B



- \* ELIMINATE ROUTE #280
- \* SAME SCREEN LINE AS LICENSE PLATE SURVEY
- \* DEALS CLOSER TO COMMUNITY INTEREST - SUCH AS #85 EXTENSION, STEVENS CREEK, DE ANZA INTERSECTION

ASSUMPTIONS:

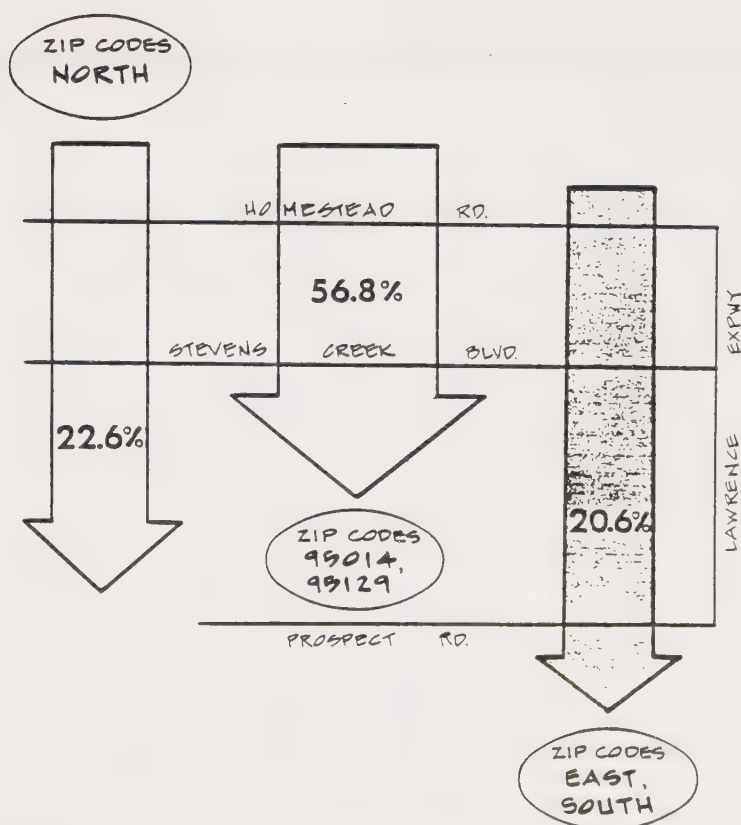
- \* ALL A.M. PEAK REVERSE DIRECTIONS AND MAINTAIN SAME MAGNITUDE IN P.M. PEAK
- \* ALL COMPONENTS OF TRAFFIC SEGREGATED



Stevens Creek Boulevard was identified as a screen line to remove the influence of Highway 280 which carries through traffic with little major influence upon the community. To evaluate through trips, it was necessary to assume that the volume of commute traffic during AM peak would reverse itself in the evening. The results of the through trip movement were also cross checked against a license plate survey conducted by residents within the West Cupertino area.

The City study, County model predictions and residents' license plate study using the same criteria and same boundary, all gained the same results which are outlined in the following chart.

### Composition of Traffic Evening Peak Hour Peak Direction





The chart illustrates that approximately 22% of the trips come from zip codes to the north during the PM peak traffic hour. The figure is high due to De Anza College students. Most of the De Anza student population (80%) lives to the north and roughly 20% live to the south. The largest percentage of PM peak hour movement is 56.8% which constitutes movement from jobs to zip code locations 95014 and 95129 located within Zone 10. Zip Code 95129 goes beyond the Zone 10 boundary to include portions of San Jose east of Lawrence Expressway and west of Saratoga Avenue. This characteristic was factored out by counting the ratio of 95129 households located outside the Zone 10 boundary as through trips.

Through trips were then calculated as roughly 20.6% of the total evening peak hour traffic within the City. In summary, the housing trip from Zone 10 is predominately to the north, 70% to 16%, and makes up approximately 14,000 trips. Job trips attracted from the south and from the north and equals approximately 8,000 trips while the through trip with Highway 280 included was 12,000 trips.

Update 1975 AM Peak to 1980, Project 1990 AM Peak and then Convert the AM Peak to to the PM Peak

Step Two of the model validation is to update the 1975 figures calculated in the County model and verified as noted above, to the present 1980 numbers. After doing this, we can then project 1990 AM peak and convert the AM peak in 1990 to PM peak. Once we leave the AM peak hour, we are no longer working directly with the Santa Clara County traffic model. It is necessary to add-in other trips including trips to De Anza College, commercial trips, and internal residential trips. The following outlines Stage Two of the model validation

#### STAGE TWO

- \* Update 1975 to 1980 Actual
- \* Project 1990 AM Peak
- \* Convert AM to PM Peak
- \* Balance Network



To fully accomplish the above steps, it is necessary to balance the transportation network. First, using a traffic volume comparison between 1980 and 1990, we were able to project that housing trips would increase from 14,000 to roughly 17,000 trips, jobs would go from 8,000 to 13,000, and through trips would go up from 12,000 to roughly 15,000 trips. These volumes are outlined below:

TRAFFIC VOLUME COMPARISON - ZONE 10

	<u>1980</u>	<u>1990</u>
* HOUSING . . . . .	14,380 . . . . .	17,400
* JOBS . . . . .	8,036 . . . . .	11,701
* THRU . . . . .	12,000 . . . . .	15,000

These volume projections were completed for each of the alternatives, one for the AM peak and one for the PM peak. We took the actual counts for all of the incoming trips, added those to the outgoing trips and obtained the difference of approximately of 2,200 trips leaving the zone during the AM peak. This difference was compared with the model's predictions for housing, jobs, and De Anza College and found roughly the same degree of difference.



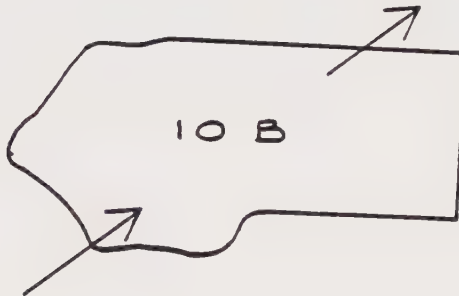
ACTUAL vs MODEL

1975

A. M. - PEAK

ACTUAL COUNTS

+ 11,950



- 9,766

= + 2,184

MODEL

1. HOUSING 10B = + 7,434

2. JOBS 10B = - 3,071

3. COLLEGE = - 2,000

$\Delta$  = + 2,167



Now, we are able to take all of the numbers and balance them almost like an accounting sheet to make sure that every time a trip is assigned to a certain screen line it adds up to the total, and ensure that it was not double counted. The following chart enumerates the trip accounting sheet for AM and PM for 1975 and the numbers projected to 1990.

COMPARISON of TRIP TYPE				
1975 (UPDATED) 10B				
TRIP TYPE	A.M.	%	P.M.	%
Hbnb + Hbsb + Hba + Hbb	7,875	45.6	7,875	37.2
Jbnb + Jbsb + Jba	3,071	17.8	3,071	14.5
Janb	1,811	10.5	1,811	8.5
College	2,200	12.7	2,525	11.9
Thru	2,300	13.3	2,300	10.8
Other			<u>3,559</u>	16.8
TOTAL	17,257		21,141	
1990 PROJECTED 10B				
TRIP TYPE	A.M.	%	P.M.	%
Hbnb + Hbsb + Hba + Hbb	9,400	45.5	9,400	36.5
Jbnb + Jbsb + Jba	3,249	15.7	3,249	12.6
Janb	3,192	15.4	3,192	12.4
College	2,200	10.6	2,525	9.8
Thru	2,629	12.7	2,629	10.2
Other			<u>4,706</u>	18.3
TOTAL	20,670		25,701	
INCREASE 1980 to 1990	19.7%		21.5%	



After considerable effort, the calculations were balanced. We then totaled all housing trips, job trips, college trips, to find out the percentate of each of these components makes up of the total traffic. The same process was repeated for 1990. The AM/PM peak hour in peak directions roughly constitutes 20% through traffic, with the other 80% composed of people returning to housing within the zone, job trips that we have created, De Anza College, and miscellaneous trips composed of shopping trips and inter-zonal trips. Once we determined the composition of traffic, at each of the screen lines, we could apply the same percentages to 1990 volumes using the various General Plan alternatives and land use generation factors. Traffic projections in volumes were developed for various streets under the alternate plans.

#### Road Capacity - Water Flow

Prior to considering the projected levels of service under the alternate plans, it is important to understand some basic concepts of traffic flow using the water flow analogy. The water flow analogy quite simply postulates that traffic like water will seek its own level or equilibrium throughout the system and like a system of water pipes, the street system has finite capacity which when reached will divert trips to other streets or result in increased pressure within the system. The water flow analogy is especially relevant when evaluting Cupertino as part of a larger transportation system. Under this analogy, it is easy to see if Cupertino improves its level of service during the peak traffic hours above that level of equilibrium obtained by the rest of the system that Cupertino will only attract "spill-over" traffic. Therefore, Cupertino must take a rather defensive strategy which "sizes" out system to equate with the remainder of the surrounding sub-County system.



This analogy is also relevant when considering level of service desired on various streets in the system. For instance, the instance upon a higher level of service may only attract higher volumes at greater speeds. The trade-off for the desired greater level of service may be more traffic, noise, etc. This analogy is equally true when visualizing the 85 extension which we will discuss later. While Highway 85 will certainly act as a relief line for other presently impacted surface streets, it will also attract trips from those surrounding arterial streets which have a lower level of service.

The following outlines the water flow/traffic flow analogy.

CAPACITY  
COMPARISON OF WATER FLOW TO TRAFFIC FLOW

-Size Pipe	-Number of lane
-Valves	-Intersections
-Pressure (higher pressure-more flow)	-Level of Service (lower level higher volume up to breakdown)
-Flow (GPM)	-Volume (vehicle/HR)

<u>DEMAND</u>	
-Need	-Desire

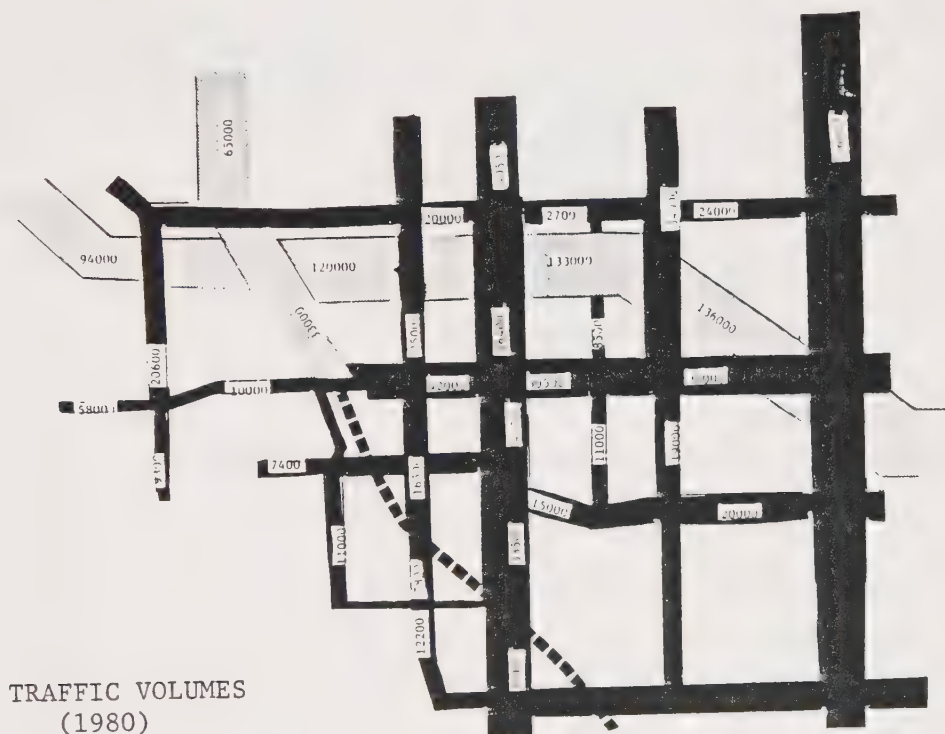
DEMAND EXCEEDS CAPACITY

- . BREAKDOWNS OCCURS
  - Large delays at signal
  - Average speeds are low
  - Volume per hour reduced
- . DIVERSION
  - If travel time less - diversion occurs



Travel lanes correspond to the pipes, intersections represent valves in the system. Higher pressure may result in a higher level of flow and total volume. When demand exceeds capacity, the system actually breaks down and results in lower volumes per hour. The flow in a pipe is measured in gallons per minute whereas on the road system vehicles per hour. The size of the pipe is usually calculated to meet the demand. With traffic, there is a desire by the motorist to take certain paths with multiple factors influencing that motorist's choice for a particular route. For instance, if the travel time along another route is less than the travel time on the present route, diversion will occur.

Assuming these very characteristics, the following chart shows existing volumes on the street system to determine where existing flows are.



De Anza Boulevard is one of the major carriers, plus Stelling Road, Wolfe Road, Bubb Road and Foothill Boulevard. Blaney Avenue is approximately equal to Bubb Road's traffic volumes, roughly 10,000 average daily trips.



Under the present system, we assume that we have a state of equilibrium. Any increase will be felt proportionately throughout all the streets in the system as the shifting to obtain equilibrium occurs.

### Level of Service

Level of service is a qualitative measure which represents the collective factors of speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort, convenience and operating costs provided by a roadway facility. Level of service is generally outlined as follows:

LEVEL OF SERVICE - Qualitative measure that represents the collective factors of speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs provided by a highway facility under a particular volume condition.

Level of Service	Description	Average Delay
A	Free flow "relatively"	0 to 14.99
B	Stable flow "slight delay"	15 to 29.99
C	Stable flow "acceptable delay"	30 to 44.99
D	Approaching unstable flow "tolerable delay"	45 to 59.99
E	Unstable flow "congestion; intolerable delay"	60 to 74.99
F	Forced flow "jammed"	75 and above

Level of Service F ("breakdown") occurs when capacity is exceeded and flow comes to a stop. This may be represented in the form of waiting through several phases at a traffic signal or coming to a stop on Highway 280. It is important to point out that level of service is not the final descriptor of traffic movement. Some areas, in their own self-interest, may desire a poor level of service to discourage that route as a through or commute corridor. Quite frequently, streets which are at Level of Service D or worse during the evening peak hour are completely freed up throughout the remainder of the day.



The following chart outlines some characteristics associated with a design Level "D":

DESIGN LEVEL

**D**

- \* BENEFIT/COST
- \* 1 - 2 HOURS/DAY
- \* OTHER PERIODS OF THE DAY - HIGHER LEVEL
- \* MATCHES LEVELS OF SURROUNDING AREA
- \* HIGHER LEVELS MIGHT ATTRACT TRIP  
RESULTING IN LOWER LEVELS ANYWAY
- \* REASONABLE TO ACHIEVE

Intersection Capacity

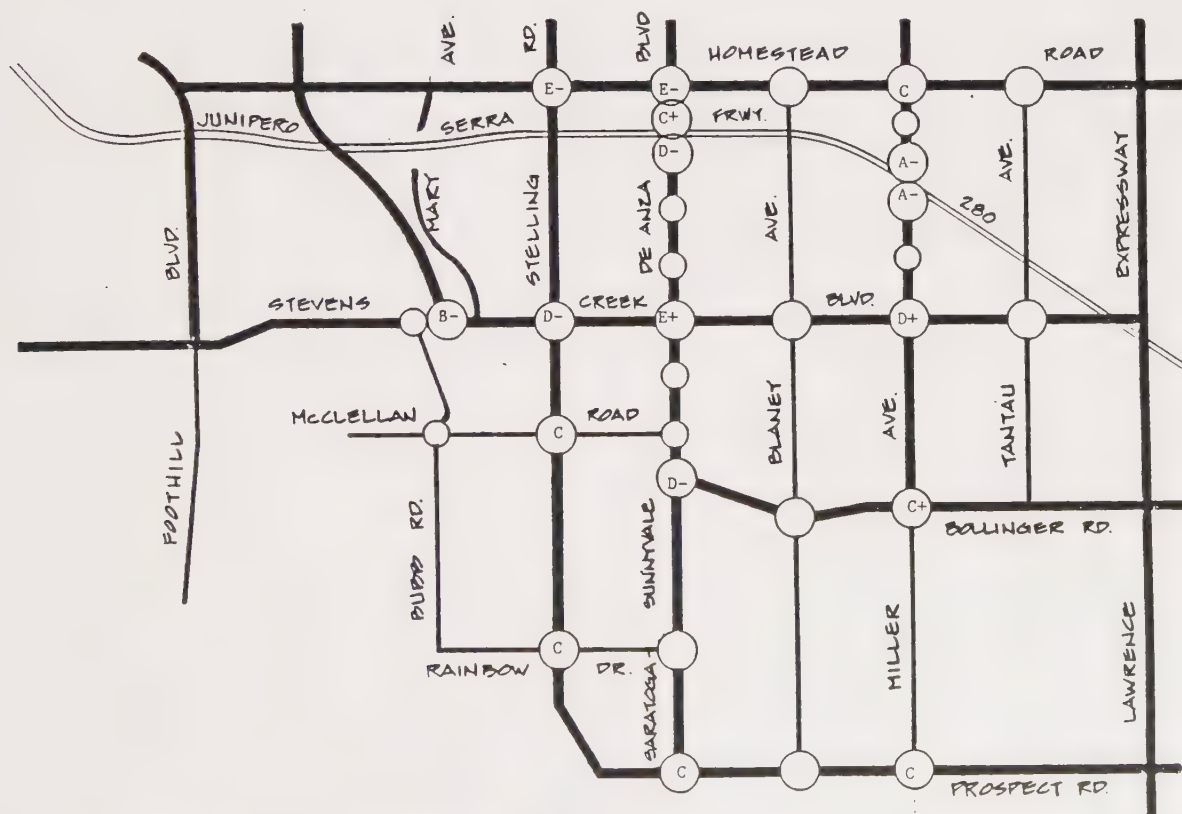
The preceding sections have discussed design levels, traffic volumes which influence the degree of and perception of traffic impacts on the community. Intersection capacity relates the ability of a particular intersection to allow cross movements, turning movements throughout all of its "legs" (approach streets), without waiting through several phases at any particular leg. Under previous General Plan transportation studies, traffic reports attempted to evaluate mid-block design levels which tended to de-emphasize the real culprit which is the intersection capacity. Obviously, it does little good for vehicles to travel freely down the mid-block only to be backed up severely at the intersections. Intersection capacity essentially represents the differen



legs of an intersection competing for the allowable green time. The traffic signal interconnect promises to help ease this problem and certainly provide a greater level of City control over the prioritization of movements. The concept of offering priority treatment during peak hours can aid the level of service at an intersection for the peak flow but with the obvious trade-off of decreasing the level of service for the leg coming from the competing cross-street.

The level of service at each intersection will be perceived differently by different individuals. If you are a resident who lives near the congested intersection, you may perceive the D level of service as a significant hinderance to convenience. The through commuter who is passing through numerous congested intersections may not be as concerned by the level of service at a particular intersection.

The following chart illustrates the intersection capacity of existing Cupertino intersections:



Level Of Service - 1979/1980



In 1973, the City strived for a goal of level of service B - C midblock within the community. Today, a B - C level is seen as impractical. The above chart illustrates that in 1980 the existing levels of service at Homestead Road and De Anza Boulevard is E minus, and at Stevens Creek Boulevard and De Anza Boulevard, E plus. For the most part, remaining inter-sections are at a D level of service or above. In 1990, after build-out under the existing General Plan with no improvements, we find the following:

F Levels of service at Stelling Road/Homestead Road, De Anza Boulevard/Homestead, Highway 280/De Anza Boulevard, De Anza Boulevard/Stevens Creek Boulevard, De Anza Boulevard/Bollinger Road, and Stelling Road/McClellan Road.



## Major Study Areas

### Introduction

There are three major study areas which need to be evaluated in conjunction with the General Plan Amendment under consideration. These major study areas are outlined below:

## **MAJOR STUDY AREAS**

- . VALLCO PARK
  - Wolfe Road
- . CORE AREA
  - De Anza Boulevard
  - De Anza Boulevard/Stevens Creek Boulevard
- . WEST CUPERTINO
  - Route 85 Corridor
  - Stelling Road

These are the areas of town which will be most directly impacted by the build-out under the General Plan. The neighborhoods surrounding the major Stevens Creek/De Anza Boulevard arterials within the Core Area of the town are more susceptible to existing through traffic movements and less insulated from the impacts of commute traffic. Generally speaking, neighborhoods located in the west end of the community along Foothill Boulevard are less subject to large through traffic movements, than areas toward the center and east end of town. The same neighborhoods have also benefited from the lowering of intensity for the Cupertino Hillside General Plan which has been followed up by larger lot zoning actions by the County.

### Vallco Park

Vallco Park's level of service at the intersections for 1980 and 1990 including the improvements needed to raise the levels to D level of service are indicated on the following chart.

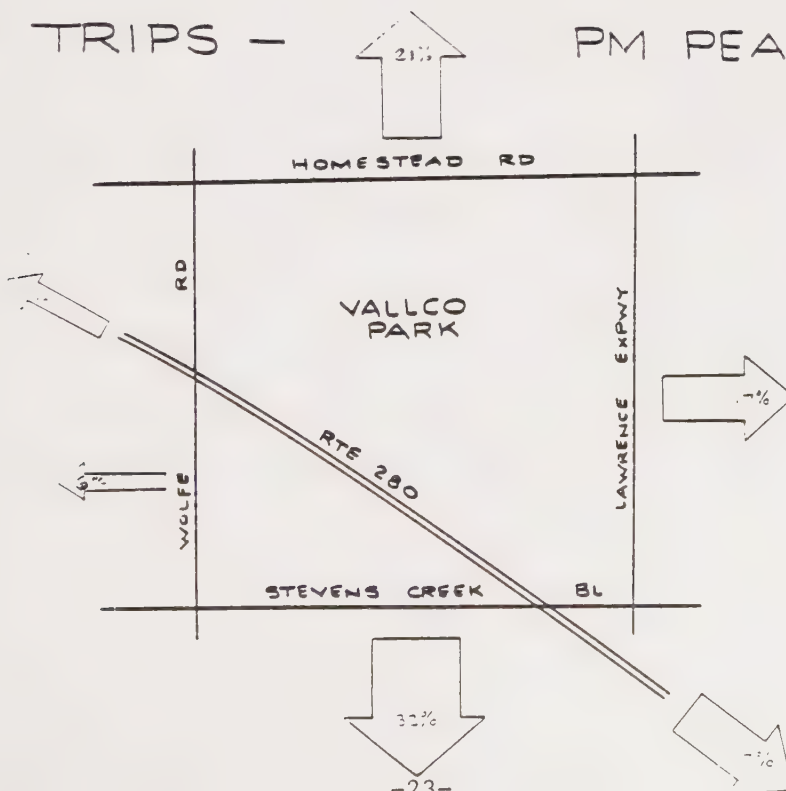


# VALLCO PARK

INTERSECTION	LEVELS OF SERVICE		IMPROVEMENT
	1980	1990	
HOMESTEAD/WOLFE	C-	D+	NO CHANGE
PRUNERIDGE/WOLFE	C-	D	LIMIT PEDS TO 1 PHASE
RT. 280/WOLFE N. RAMP	A-	A-	NO CHANGE
RT. 280/WOLFE S. RAMP	A-	A-	NO CHANGE
VALLCO PARKWAY/WOLFE	C-	D+	NO CHANGE
STEVENS CREEK/WOLFE	D+	D	R.T.O. E/B TO S/B
BOLLINGER/WOLFE	C	D+	NO CHANGE
PROSPECT/WOLFE	C	C-	NO CHANGE

The following chart illustrates the PM traffic distribution from jobs in Vallco Park.

JOB TRIPS - PM PEAK





Only two areas need some improvements, Pruneridge and Wolfe Road, and Stevens Creek Boulevard/Wolfe Road. Vallco Park certainly has benefited from its past roadway and intersection improvements. The above table illustrates that Vallco Park has an abundance of internal capacity. The only unknown factor is the future capacity of Route 280. Two added lanes on Highway 280 are planned by 1985/86 in the California State Transportation Improvement Program (STIP). There is always a chance that the State's attitude toward highway construction may result in modifications to future planned improvements. For the purposes of the Vallco Park area, the level of service evaluation assumes build-out under the existing General Plan which would allow the constrained areas to be developed at an intensity of roughly 33% or 35% building to land area ratio, with no potential development on the Lester parcel and the hotel parcel.

#### Core Area

The "Core Area" consists of the area around the intersection of Stevens Creek Boulevard and De Anza Boulevard and the mid-block areas from the Town Center to Vallco Park and from Town Center to Highway 280.

The Stevens Creek Boulevard/De Anza Boulevard intersection has two improvement alternatives. One alternative brings the level to an E plus with right turn only lanes, while the second brings the intersection to a D minus with a south bound lane added on De Anza Boulevard between Stevens Creek Boulevard and Bollinger Road. The second alternative could be implemented along the area north of Stevens Creek Boulevard through restriping, but requires some additional dedication for that portion of De Anza Boulevard south of Stevens Creek Boulevard. The Core Area improvements also call for intersection widening improvements at Bollinger Road to provide a double left turn in three continuous south bound lanes. The fourth south bound lane would terminate as a right turn lane only at McClellan Road.



The following chart illustrates the existing and projected levels of service under various intersection improvements within the Core Area.

CORE AREA

INTERSECTION	LEVELS OF SERVICE		IMPROVEMENT
	1990	1990	
HOMESTEAD/DE ANZA	E-	D	R.T.O. S/B TO W/B 2 L.T.O. W/B TO S/B
RT. 280/DE ANZA N. RAMP	C+	C	NO CHANGE
RT. 280/DE ANZA S. RAMP	D-	D+	2 L.T.O. E/B TO N/B
MARIANI/DE ANZA	C-	D	LIMIT PEDS TO 1 PHASE
LAZANEO/DE ANZA	B-	C	NO CHANGE
STEVENS CREEK/DE ANZA	E+	F	NO CHANGE
ALTERNATE 1		E+	2 L.T.O. W TO S R.T.O. S TO W
ALTERNATE 2		D-	ALT. #1 PLUS 4 LANES S/B - NO R.T.O.
RODRIGUES/DE ANZA	B-	C	NO CHANGE
MC CLELLAN/DE ANZA	C+	D	NO CHANGE
BOLLINGER/DE ANZA	D-	D	2 L.T.O. S TO E 3 LANES THRU LIMIT PEDS TO 1 PHASE
RAINBOW/DE ANZA	B+	B	NO CHANGE
PROSPECT/DE ANZA	D	D	NO CHANGE



## West Cupertino

West Cupertino is a particularly sensitive area which is now impacted by commute traffic on Stelling Road, traffic attracted to De Anza College and a significant component of residential traffic attracted to the adjoining neighborhoods along Stelling Road, Bubb Road, and McClellan Road. The analysis for the West Cupertino area evaluated options for accommodating the West Cupertino traffic component under the existing General Plan assuming no improvements along Route 85 and then later with improvements on Route 85. The Environmental Impact Report for the Seven Springs Ranch prepared by Sedway/Cooke evaluates the impacts of the proposed residential development. The following chart illustrates the 1982 and 1990 level of service at the affected intersections:



## TRAFFIC AND CIRCULATION

### INTERSECTION SERVICE LEVELS AND CIRCULATION IMPROVEMENTS

INTERSECTION	LEVELS OF SERVICE <sup>2</sup> 1982	1990*	CIRCULATION IMPROVEMENTS
① Prospect & Stelling AM PM	B+ A-	B- A-	if traffic signals are installed
② Prospect & DeAnza AM PM	C+ C+	B C+	if 6 lanes on De Anza plus double left turn lane are provided
③ Stelling & McClellan PM	C	C-	
④ McClellan & Bubb PM	C-	D	
⑤ Rainbow & Stelling PM	B-	C-	with widening of both streets at intersection

\*Intersection service levels for 1990 assume no Route 85 extension.

### <sup>2</sup>TRAFFIC SERVICE LEVELS

LEVEL OF SERVICE	TECHNICAL DEFINITION	SHORT DEFINITION
A	Free Flow (Uncongested)	Good, no congestion
B	Stable Flow (Slight Delay)	Some congestion
C	Stable Flow (Acceptable Delay)	Concentration
D	Approaching Unstable Flow	High congestion
E	Unstable Flow (Long Delay)	Very high congestion
F	Complete Flow (Breakdown)	Breakdown

Source: George S. Nolte and Associates, August 1981. (See Appendix I for full report.)

SEVEN SPRINGS RANCH EIR  
City of Cupertino, California

SEDWAY/COOKE



All of the intersections operate at D or better level of service with the exception of the intersection of Stelling Road and McClellan Road during the PM peak hour in 1990 which is projected to operate at an E minus level of service. A right turn lane south bound to west bound improves the level of service at this intersection to D.

De Anza College is a fairly significant contributor to traffic in this area amounting to approximately 2,200 trips during the peak hour which represents about 20% of the total movement. Some changes to the access to De Anza could perhaps help the situation with a direct access into the campus via the west lot or the Flint Center lot allowing students to circulate through the campus to locate available parking.

Throughout the West Cupertino area there are several alternatives which can be evaluated to help alleviate some of the traffic impacts. These alternatives are outlined below:

#### WEST CUPERTINO

##### ALTERNATIVES:

- . REDUCE DEMAND
  - By diversion
  - By increasing travel time
  - By decreasing travel time on other major roadways
- . INCREASE DEMAND
  - By adding more lanes
  - By decreasing travel time
- . COMBINATION OF ABOVE
  - By adding lanes equivalent to local demand only
  - By maintaining same level as adjacent roadways



The alternatives include 1) reducing demand by diversions which increase travel time through the neighborhood and decreasing travel time on other major roadways; and 2) increase the demand by adding more lanes in the area (perhaps 85 or Stelling Road).

These improvements could decrease travel time and then increase demand in the area. The fourth option is a combination of reducing demand and/or increasing demand to achieve the objectives of reducing through commute traffic:

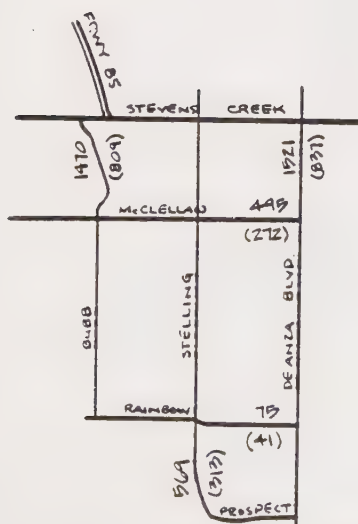
The West Cupertino homeowners completed a survey of traffic during the peak hour with the following results:

### WEST CUPERTINO RESIDENCE STUDY

TABLE 1. 1981 ANALYSIS RESULTS

#### 2 HR. COUNTS

LOCATION	NUMBER OF VEHICLES	PERCENT OF TOTAL
ENTERING BUBB ROAD	1,470	
EXIT VIA MC CLELLAN	191	13 %
EXIT VIA RAINBOW	29	2 %
EXIT VIA PROSPECT	250	17 %
	----	----
TOTAL COMMUTERS	470	32 %
ENTERING STELLING FROM #85	1,521	
EXIT VIA MC CLELLAN	304	20 %
EXIT VIA RAINBOW	46	3 %
EXIT VIA PROSPECT	319	21 %
	----	----
TOTAL COMMUTERS	669	44 %

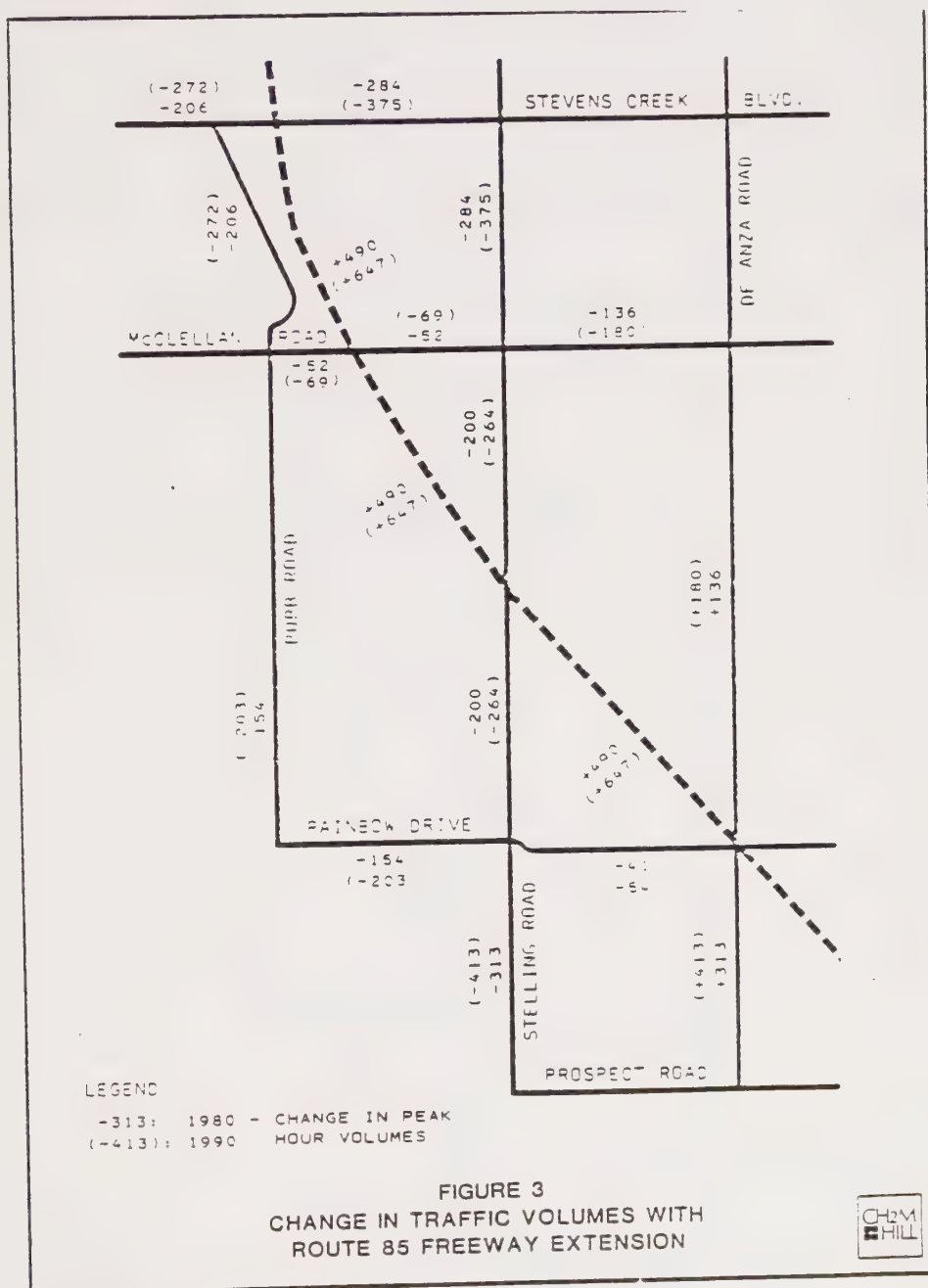


#### LEGEND

2-HOUR 1470  
 \* 1-HOUR (809)  
 \* 24R x 55%



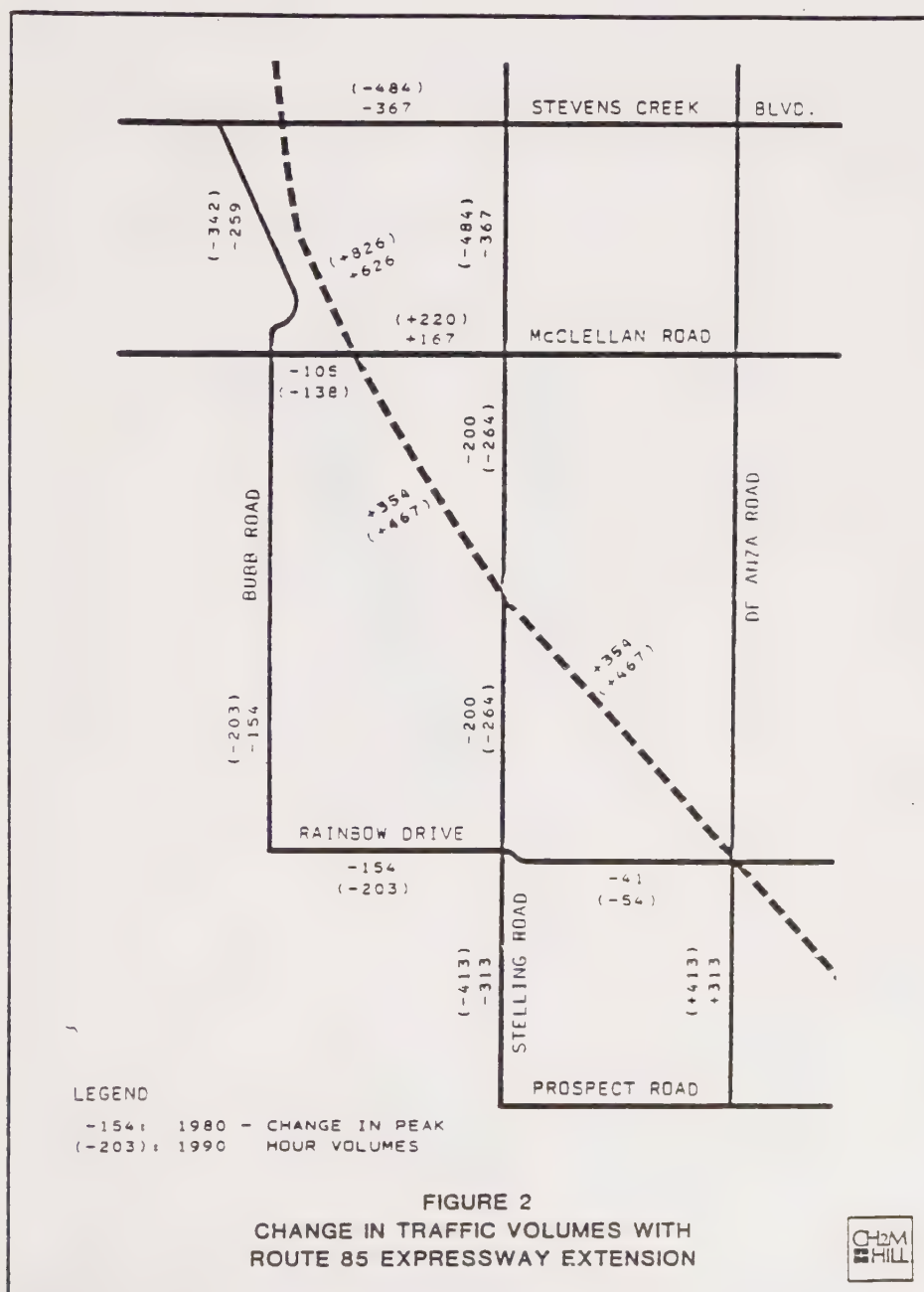
The above information was utilized by the CH<sub>2</sub>M Hill report and helps to confirm some of the conclusions arrived at by the staff. The following information evaluates the impact of Highway 85 in terms of attracting or diverting traffic off Bubb Road and Stelling Road. 1980 is indicated without parenthesis while 1990 is with parenthesis.



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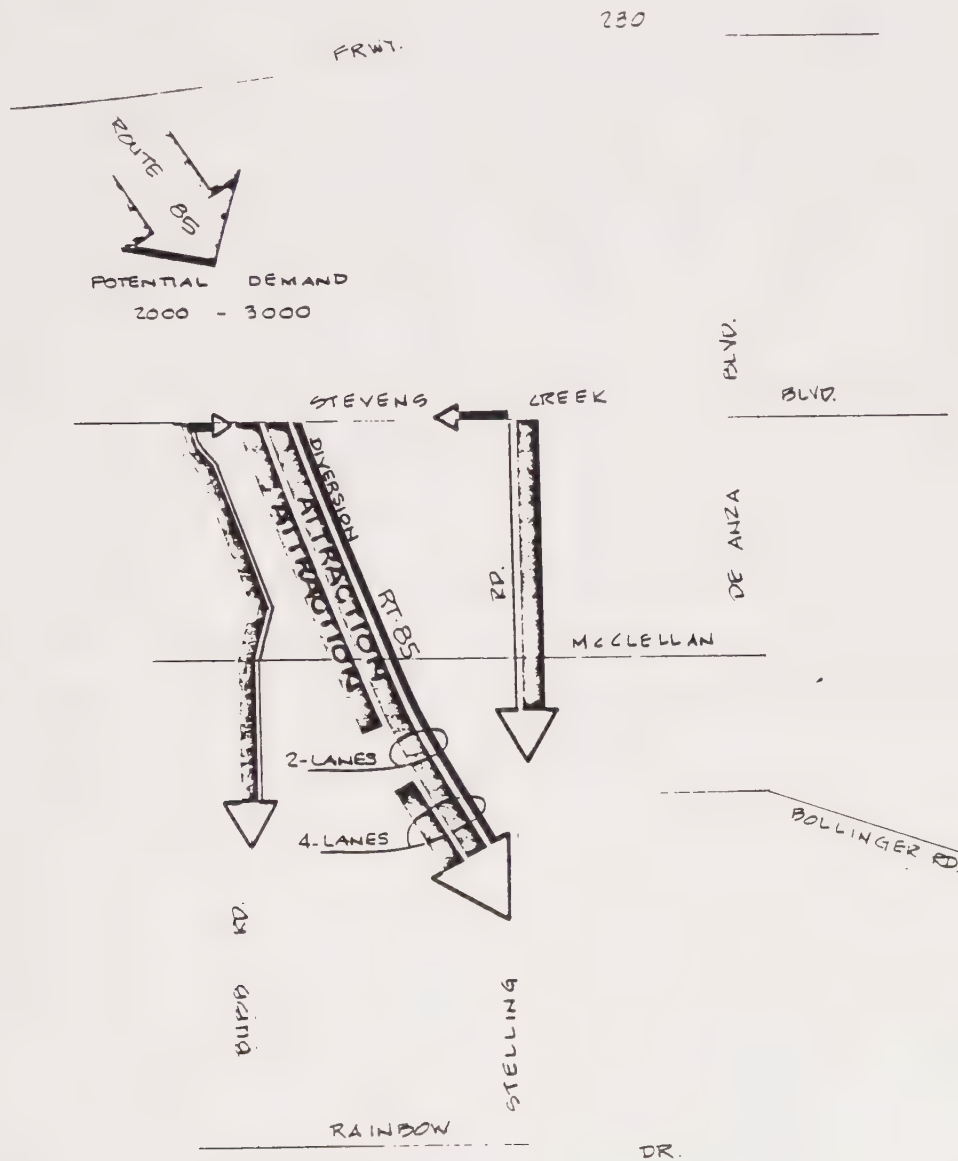


As the above chart illustrates, a freeway would divert approximately 203 cars off Bubb Road south of McClelland and 264 cars off Stelling Road in 1990. These cars are the same cars that are found today at Route 85 north of Stevens Creek Boulevard and later matched up through license plates at the south of Rainbow Drive. The cars actually exited at Rainbow Drive and at Stelling Road at Prospect Road. If an expressway were built, those numbers would be modified slightly to reflect 354 trips off of the two roadways now and 467 off of the two roadways in 1990. The following chart graphs a diversion which would occur with an expressway:





The following chart graphically illustrates the amount of diversion from the potential demand on Route 85 of 2,000 to 3,000 cars. In effect, a full extension of a freeway from the present terminus of Route 85 to De Anza Boulevard or Prospect Road would open the gates and attract a considerable level of traffic which this area of Cupertino does not have today. The cost for the Route 85 extension would be roughly five to seven million dollars depending on whether it is a two lane or a four lane roadway.



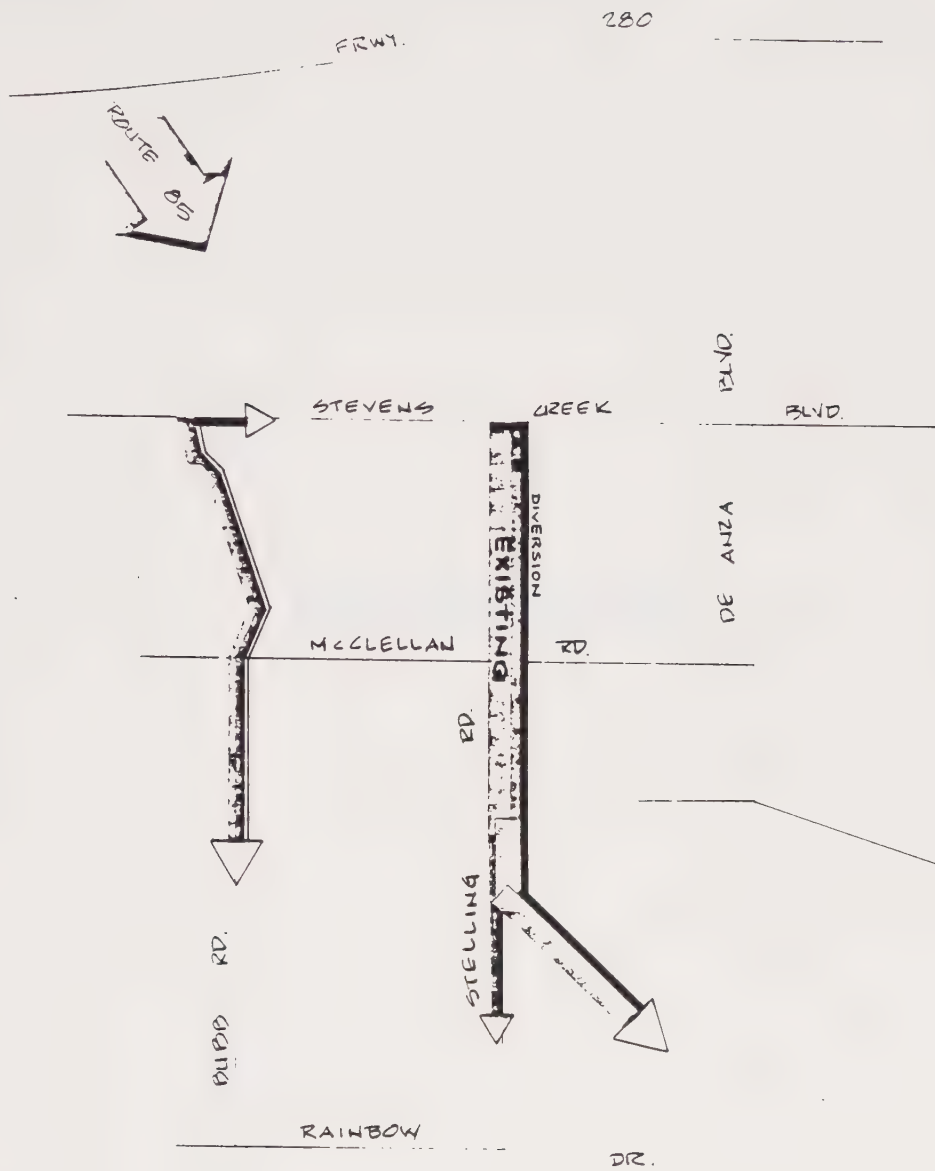
RT. 85-EXTENDED  
 \$5 - 7 MILLION



Certainly, a significant portion of the diversion would be those people who now stay on Highway 280 to De Anza Boulevard and then head south bound. Other diversion would occur off Wolfe Road, Lawrence Expressway, or a longer commute trip utilizing 280 to Route 17 to Los Gatos. It is not possible to fully quantify the exact destination of diverted traffic.

The next chart illustrates the effect of a semi-diversion costing roughly two to three million dollars. This alternative takes traffic off Stelling Road through a two to four lane roadway in the 85 Corridor and out to De Anza Boulevard. This, in effect, would be diverting traffic off Bubb Road and allowing traffic to stay on Stelling Road up to the point where the diversion would occur. This diversion represents approximately half of the entire stretch of the 85 right of way within Cupertino. Presently, Stelling Road is 70% capable of being striped for four lanes with only 30% needing additional widening or improvement. It must be pointed out that any improvements in the 85 Corridor will, of course, bring with it noise and some diversion of traffic not now utilizing the roadway. These neighborhoods are presently bordered on the east by a major arterial and bisected by Stelling Road which functions as major collector. The extension of 85 would represent another arterial street which would bisect the neighborhood. With the semi-diversion concept, Stelling Road would still have to be four lanes up to the diverted point with a transition from the intersection of McClellan Road and Stelling Road.

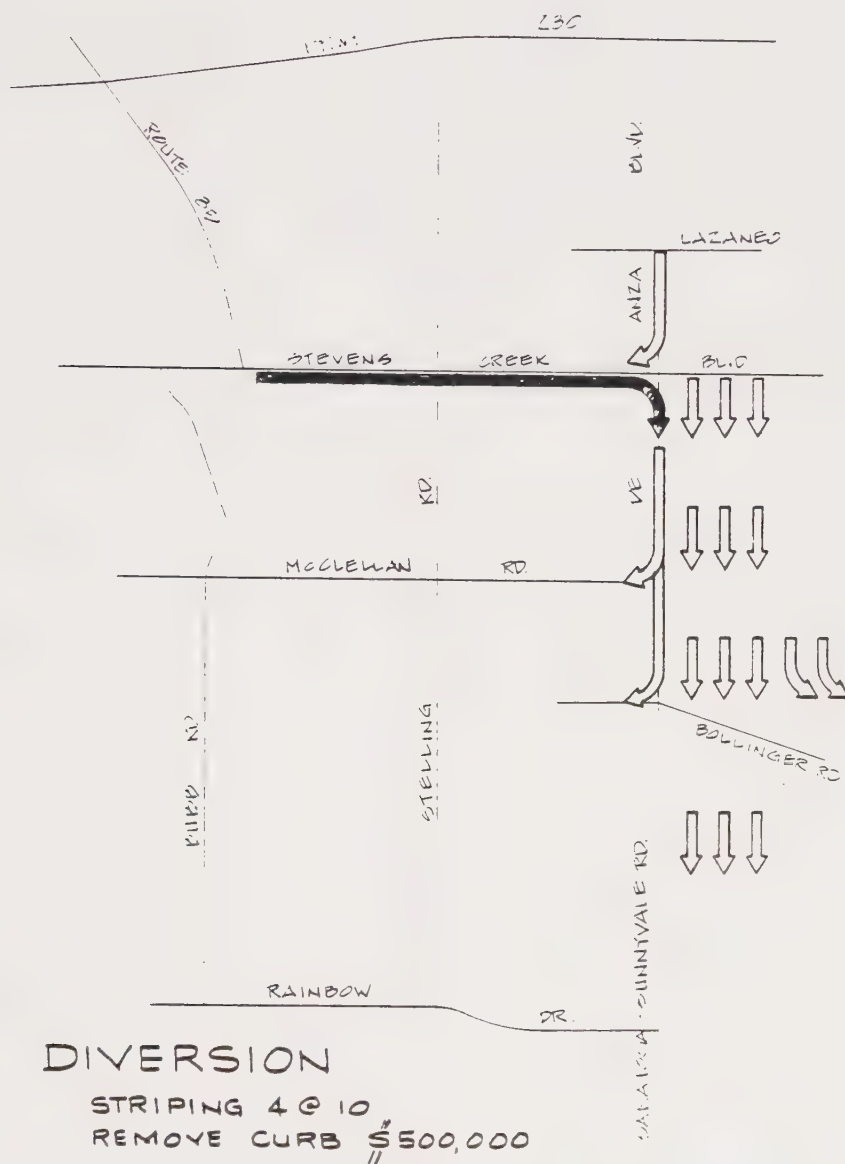




SEMI-DIVERSION  
 // \$ 2 - 3 MILLION  
 //



The chart below illustrates a diversion of traffic utilizing improvements on De Anza Boulevard alone. This would attract roughly 300 to 400 vehicles that originate up around Highway 85 and Stevens Creek Boulevard and take them along Stevens Creek Boulevard away from residential areas onto a new lane on De Anza Boulevard from Stevens Creek Boulevard to Bollinger Road.





Beefing up De Anza Boulevard has some attractiveness both from a cost standpoint and in terms of accommodating the traffic which now is forced through Stelling Road. This option, of course, implies that there be major improvements conducted at Bollinger Road and De Anza Boulevard to accommodate upturn lanes during the PM peak traffic hour with adequate through lanes. The improvements at Bollinger and De Anza Boulevard would, of course, be partially shared by the City of San Jose who shares that intersection.

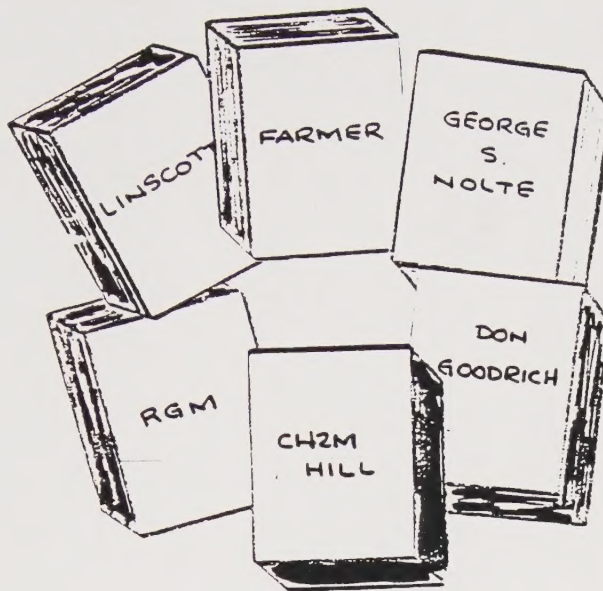
#### Summary

The above analysis builds upon the MTC/ABAG transportation model and the Santa Clara County AM peak model based upon build-out of existing General Plans. It assumes a D level of service and attempts to project the traffic from the 1975 Am peak model to 1980 and then project traffic through 1990 based on the existing General Plan. These projections were then converted to PM peak hour trips and utilized to evaluate the four General Plan land use options based upon their land use combinations and known traffic generation characteristics.

This technical traffic review is utilized to develop a transportation strategy which attempts to the best degree possible, to ensure that Cupertino residents can utilize Cupertino streets and not over-build the system such that we attract traffic from outside areas.

The conclusion of the traffic evaluation were confirmed by a number of consultants and methodology evaluated in detail by Ch2M Hill in their report to the Cupertino Goals Committee. Several traffic consultants utilized the same base and much of the same information as illustrated below:





\* SEVERAL CONSULTANTS HAVE REVIEWED  
AND USED MODEL

\* CH<sub>2</sub>M HILL RETAINED BY GOALS COMMITTEE  
FOR THE PURPOSE OF REVIEWING STAFF'S  
REPORT, STEP BY STEP

The preceding analysis evaluated some principles of traffic including a water flow analogy, traffic volumes, design level D rationale and intersection capacity. The evaluation included a detailed look at three study areas: Vallco Park, the Core Area, and the West Cupertino area.



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